

Rocks and the Rock Cycle

The earth's crust is composed of many kinds of rocks, each of which is made up of one or more minerals. Rocks can be classified into three basic groups: igneous, sedimentary, and metamorphic. Igneous rocks are the most common rock type found in the earth's crust. They form when magma cools and crystallizes subsurface (intrusive igneous rocks) or lava cools and crystallizes on the surface (extrusive igneous rocks). Granite is an example of an intrusive igneous rock, whereas basalt is an extrusive igneous rock.

Sedimentary rocks are formed by the consolidation of the weathered fragments of pre-existing rocks, by the precipitation of minerals from solution, or by compaction of the remains of living organisms. The processes involving weathered rock fragments include erosion and transport by wind, water or ice, followed by deposition as sediments. As the sediments accumulate over time, those at the bottom are compacted. They are cemented by minerals precipitated from solution and become rocks.

The process of compaction and cementation is known as lithification. Some common types of sedimentary rocks are limestone, shale, and sandstone. Gypsum represents a sedimentary rock precipitated from solution. Fossil fuels such as coal and oil shale are sedimentary rocks formed from organic matter.

Metamorphic rocks are formed when solid igneous, sedimentary or metamorphic rocks change in response to elevated temperature and pressure and/or chemically active fluids. This alteration usually occurs subsurface. It may involve a change in texture (recrystallization), a change in mineralogy or both. Marble is a metamorphosed form of limestone, while slate is transformed shale. Anthracite is a metamorphic form of coal.

The rock cycle illustrates connections between the earth's internal and external processes and how the three basic rock groups are related to one another. Internal processes include melting and metamorphism due to elevated temperature and pressure. Convective currents in the mantle keep the crust in constant motion (plate tectonics). Buried rocks are brought to the surface (uplift), and surface rocks and sediments are transported to the upper mantle region (subduction).

Two important external processes in the rock cycle are weathering and erosion. Weathering is the process by which rock materials are broken down into smaller pieces and/or chemically changed. Once rock materials are broken down into smaller pieces, they can be transported elsewhere in a process called erosion. The main vehicle of erosion is moving water, but wind and glaciers can also erode rock.

Weathering
Building Stone



Erosion
Grand Canyon

